

Claims

1. A method of encoding a frame in a communication network using a plurality of codec modes, wherein the frame encoded by each codec mode is represented by a plurality of parameters, said method comprising at least one stage and wherein said at least one stage comprises the steps of:
 - selecting from a plurality of groups of codec modes one group, wherein each group comprises at least one codec mode and is arranged to have a common parameter characteristic; and
 - encoding the frame with one of the codec modes from the selected group in dependence on said common parameter characteristic.
2. A method as claimed in claim 1 comprising a plurality of stages.
3. A method as claimed in claim 1, wherein the parameters comprise one or more of: a VAD flag, an LTP filtering flag parameter, an ISP parameter, a pitch delay parameter, an algebraic CB parameter, a gain parameter and a high-band energy parameter.
4. A method as claimed in claim 3, wherein the parameter characteristic is the bit size of the parameter.
5. A method as claimed in claim 1, wherein the frame is a speech frame.
6. A method as claimed in claim 1, wherein the group consists of one or more of said codec modes.
7. A method as claimed in claim 1, wherein the step of selecting a codec mode group is in dependence on parameters determined from the encoding of the frame.

8. A method as claimed in claim 7, wherein the parameters are compared to threshold values.

9. A method as claimed in claim 8, wherein the one of the codec modes
5 selected to encode the frame is dependent on the comparison of the threshold values.

10. A method as claimed in claim 8, wherein the thresholds are dependent on a target bit rate.

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11. A method as claimed in claim 8, wherein the thresholds are stored in a tuning table, the tuning table comprising thresholds for each parameter corresponding to each of the plurality of codec modes.

12. A method as claimed in claim 1, wherein each of the plurality of codec
15 modes define a bit rate for encoding a frame.

13. A method as claimed in claim 1, wherein said at least one stage being arranged to have a group with the codec mode with a lowest bit rate and
20 another group with the remaining codec modes.

14. A method as claimed in claim 13 comprising at least two stages, wherein said first stage being arranged to have two groups and said second stage being arranged to have at least three groups, wherein at least two of the
25 groups of the second stage are contained in the same group of the first stage.

15. A method as claimed in claim 14 comprising three stages, wherein in said third stage, said frame is encoded by one of said plurality of codec modes.

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16. A method as claimed in claim 1, wherein the plurality of codec modes are codec modes of an adaptive multi rate codec.

17. An apparatus for encoding a frame in a communication network using a plurality of codec modes, wherein the frame encoded by each codec mode is represented by a plurality of parameters, said apparatus comprising at least one stage and wherein said at least one stage comprises:
- 5 means for selecting from a plurality of groups of codec modes one group, wherein each group comprises at least one codec mode and is arranged to have a common parameter characteristic; and
- 10 means for encoding the frame with one of the codec modes from the selected group in dependence on said common parameter characteristic.
18. An apparatus as claimed in claim 17 comprising a plurality of stages.
19. An apparatus as claimed in claim 17, wherein the parameters comprise one or more of: a VAD flag, an LTP filtering flag parameter, an ISP parameter,
- 15 a pitch delay parameter, an algebraic CB parameter, a gain parameter and a high-band energy parameter.
20. An apparatus as claimed in claim 19, wherein the parameter characteristic is the bit size of the parameter.
21. An apparatus as claimed in claim 17, wherein the frame is a speech frame.
22. A method of determining a codec mode for encoding a frame in a communication system, wherein the communication system comprises a voice activity detection module for detecting silent frames and a codec mode selection module, said method comprising:
- 25 receiving at the voice activity detection module a frame;
- 30 determining at the voice activity detection module a first set of parameters from the frame;

providing the first set of parameters to the codec mode selection module;

determining at the codec mode selection module a second set of parameters in dependence on the first set of parameters; and

5 selecting a codec mode for encoding the frame at the codec mode selection module in dependence on the second set of parameters;

23. A method as claimed in claim 22, wherein the codec mode selection module is a source base rate adaptation algorithm module.

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24. A method as claimed in claim 22, wherein the frame is a speech frame.

25. A method as claimed in claim 22, wherein the first set of parameters comprises one or more parameters and the second set of parameters

15 comprises one or more parameters.

26. A method as claimed in claim 22, wherein the first set of parameters comprises at least one of a sub-band energy level and a background noise estimate.

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27. A method as claimed in claim 22, wherein the voice activity detection module comprises a filter bank module and a background noise estimation module.

25 28. A method as claimed in claim 26, wherein the first set of parameters is determined by at least one of the filter bank module and the background noise estimation module.

29. A method as claimed in claim 22, wherein the second set of
30 parameters comprises at least one of the normalised energy levels in each sub-band of the frame and the average frequency of the frame.

30. A method as claimed in claim 22, wherein the codec mode selection module comprises a sub-band level normalisation module and a frame content analysis module.

5 31. An apparatus for determining a codec mode for encoding a frame in a communication system, the apparatus comprising:

a voice activity detection module for detecting silent frames and a codec mode selection module for determining a codec mode; and
said voice activity detection module comprising:

10 means for receiving a frame;
means for determining a first set of parameters from the frame;
and
means for providing the first set of parameters to the codec mode selection module;
15 said codec mode selection module comprising:
means for determining a second set of parameters in dependence on the first set of parameters; and
means for selecting a codec mode in dependence on the second set of parameters;

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32. An apparatus as claimed in claim 31, wherein the codec mode selection module is a source base rate adaptation algorithm module.

25 33. An apparatus as claimed in claim 31, wherein the frame is a speech frame.

34. An apparatus as claimed in claim 31, wherein the first set of parameters comprises one or more parameters and the second set of parameters comprises one or more parameters.

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35. An apparatus as claimed in claim 31, wherein the first set of parameters comprises at least one of a sub-band energy level and a background noise estimate.
- 5 36. An apparatus as claimed in claim 31, wherein the voice activity detection module comprises a filter bank module and a background noise estimation module.
- 10 37. An apparatus as claimed in claim 31, wherein the second set of parameters comprises at least one of the normalised energy levels in each sub-band of the frame and the average frequency of the frame.
- 15 38. An apparatus as claimed in claim 31, wherein the codec mode selection module comprises a sub-band level normalisation module and a frame content analysis module.